



# THE WIRE

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## February 2023

### The Presidents' Letter

For this February 2023 edition of *The Wire* I hope all of our members are doing well and are staying healthy. Everyone seems to be busy and the demand for electrical needs seems to be exceptionally high.

Our January 9th general membership meeting was attended by 53 members. Dennis Steier, Norb Thorpe, and myself reviewed general code questions. This review was well received with good questions and discussion.

Again, there is nothing new to report in regards to the adoption of the 2020 NEC. The 2023 edition is available. The longer the delay in adoption continues, the harder it is going to be on the electrical industry.

The ECHL will be offering a continuing education class for contractor license renewal on Saturday February 11th. It runs from 8 am till 2 pm, with sign-ins beginning at 7:30 am. It will be held at the Elks Lodge. Coffee, doughnuts, and lunch will be provided.

Our February 13th the general membership meeting will conduct the election for new officers. Also, we will host Engineer Nick Jewell and Metro Inspector Norb Thorpe to discuss solar energy solutions. This topic has been an ongoing request by the membership.

The 50/50 drawing was for \$59 and was won by Tom Kruer. Do not forget, if you have any suggestions on presentations, please get with one of the board members.

As mentioned in the last several newsletters, the Department of Housing, Building, and Construction has gone to a new data base system which will no longer allow users to search for their licenses or their continuing education hours. We have had several members whose hours were not transferred from the old data base into the new one. So, for more information or any

### FEBRUARY 13, 2023 Code Program

**Sign-in 6:30 P.M. - Program at 7:00 P.M.**  
**ELKS LODGE # 8 - 2824 KLONDIKE LN -**

Our February program will be presented by LG&E and Louisville Metro Inspections on Solar. This program is been a request on on-going request from our members.

Nick Jewell, LG&E and Norb Thorpe, Louisville Metro Inspections will discuss solar energy solutions and invite questions from the members.

Solar is one of the top issues being addressed in the NEC, and is one of the topics that has been requested from our members.

Dennis Steier will go over the Code Questions in the February 2023 Wire.

See you Monday Evening, February 13, at 6:30 pm.

### Supporting our Industry

**\*\* Electrical Equipment Needed \*\***

ECHL is committed to supporting the electrical industry and the training required to further the trade. In doing so, we ask for your old equipment / inventory to use for training.

ECHL contractors and or suppliers - if you are cleaning out your old Inventory and have material (electrical equipment) that is taking up space in your warehouse, the Iroquois High School Electrical Program is seeking material that can be used for teaching students about electrical products they may encounter in the field. Educating our future apprentices is the goal.

IEC is the hub for most of the surrounding area's for the electrical trade training schools. She has contacts for Jefferson County, Bullitt County, to Hardin County.

If you would call, Erin Pretorius or Stephanie at 502-493-1590 or email Erin at erin@iec-kyin.com to make arrangements for pick up or delivery.

Old or new! - Thanks for your support!

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### FEBRUARY Code Questions

1. If you have a 2" rigid conduit with a 75C rated bushing, can you install conductors rated at 90C conductors in that raceway and be in compliance with the 2017 NEC? Where would you find this answer in the 2017 NEC?

YES NO

Section \_\_\_\_\_

2. Can you drill additional holes in the back of a box in the field to fasten the box and be in compliance with the 2017 NEC? Where would you find this answer in the 2017 NEC?

YES NO

Section \_\_\_\_\_

3. When you are looking for where a product is Permitted or Not Permitted by the NEC, what Part of the Article would it be in and what would be the dot number for them?

Article \_\_\_\_\_ Dot \_\_\_\_\_

4. What is the required Wire-Bending space to the terminal of and enclosed motor controller for 2 350 MCM conductors? Where would you find this answer in the 2017NEC?

A) 16" C) 10"  
B) 14" D) None of above

Section \_\_\_\_\_

5. Can you install a FS box with a cover and gasket for a termination in a Class 1 Division 2 environment and be in compliance with the 2017 NEC? Where would you find this answer in the 2107 NEC?

YES NO

Section \_\_\_\_\_

6. Can you make up your own extension cords with portable cord and components and meet the 2017 NEC? Where would you find this answer in the 2017 NEC?

YES NO

Section \_\_\_\_\_

### Code Corner

#### Article 300

I received a call regarding burial depth on and underground service under a street that promoted me to address Article 300 **General Requirements for Wiring Methods and Materials** for this month Corner topic. There are a lot of other things covered in Article 300 that you may also need to refer to for your project.

The call I received was regarding an underground service installation downtown where there was another concrete encased service that would not allow them to get to the burial depth. Table 300.5 has the required burial depth and this one was under a street which would require 24" burial depth that they could not achieve. If you go to the notes at the bottom of the Table Note: 5 states: *Where solid rock prevents compliance with the cover depths specified in this Table, the wiring shall be installed in a metal raceway or non-metallic raceway permitted for direct burial. The raceway shall be covered by a minimum of 50 mm (2 in) of concrete extending down to the rock.*

Article 300 is in Chapter 3 of the *NEC* which is as the title of the Article states: **Wiring Methods and Material**. There are a lot of situations you may face on your project that may have you to refer to this Article for your installation. Perhaps the project may require you to Parallel conductors you may have to refer to 300.3 (B) (1) for guidance for the installation. With a lot of Photovoltaic systems now being installed you may have ac and dc systems in the installation you would need to refer to 300.3(C) (1) for the installation. Supporting and installation requirements of raceways and cables are addressed in this article as well.

There is a lot of information I Article 300 that need to be followed for a proper installation that meeting the requirements of the 2017 *NEC*.

*Submitted by Dennis Steier*

### **Top Three Code Violations Louisville Metro Inspections JANUARY 2023**

**These violations are costing you time and money.**

1. NEC Article # 230.8 Raceway Seal

Where a service raceway enters a building or structure from an underground distribution system, it shall be sealed in accordance with 300.5 (G),. Spare or unused raceways shall be also be sealed. Sealants shall be identified for use with a cable insulation, shield, or other components.

2. NEC Article # 110.25 lockable disconnecting Means.

IF a disconnecting means is required to be lockable open elsewhere in this *CODE*, it shall be capable of being locked in the open position. The provisions for locking shall remain in place with or without the lock installed.

3. NEC Article # 110.22 Identification of disconnecting Means

Each disconnecting means shall be legibly marked to indicate its purpose unless located and arranged so the purpose is evident. The making shall be of sufficient durability to withstand the environment involved.

Each of these articles listed above are associated with a violation. Please review the articles for compliance and keep in mind to follow through with the current approved CODE.

Being Turned down on a project, you lose money and time required to return to the job site for repairs to correct the violation.

We hope this will help save you time and money on inspection fees by reviewing the articles and making sure you have not violated the code before calling for the initial inspection.

*Submitted by Arnold Hornback  
Assistant Chief Electrical Inspector  
Louisville Metro Dept of Codes and Regulations*

### **The Presidents' Letter Cont'd**

problem please call the Department at (502) 573-2002.

Our next general membership meeting is Monday February 13<sup>th</sup> at the Elks Lodge located at 2824 Klondike Lane. The meeting starts at 7:00 pm with sign-ins beginning at 6:30 pm. Hope you will be able to attend. If the opportunity arises, mention the Clearing House to your coworkers. I think they would be pleased with the continuing education presentations.

As Always Stay Safe and Work Safe  
Steve Willinghurst  
ECHL President

**\*\*\*\*\* THIS IS YOUR LAST NOTICE \*\*\*\*\***

### **!!! ECHL'S CONTRACTOR CLASS !!!**

Mark your calendar for February 11, 2023 for ECHL's Annual Contractor Class. Class will be held at the Elk's Lodge again this year with Lunch provided. Cost has remained the same.

Please contact Denise Arnold (502) 491-5010 or Marilyn Boudreaux (502) 528-9319 to save you a spot and save you the "Pay at the door price?"

### **LG&E NEWS**

Each week seems to bring another adventure related to supply chain issues within our industry. At the time of this writing, LG&E electric locators are starting to receive an increased number of calls related to not being able to find an approved single phase splice box that is listed in the LG&E Electric Service Handbook. If you have or having issues locating a splice box, please do not purchase whatever may seem to be a similar product. If a similar product is found, please contact the LG&E electric locator to get approval for anything that is outside of our standards.

*Submitted by Joel McCauley  
Team Leader Electric Design Svcs  
LG&E and KU Energy LLC*

### **Updates to NEC 2020 that solar installers need to know**

As of August 2021, 13 states have already adopted NEC 2020 and eleven states are undergoing the process of adoption. For the solar industry, these updates to the electrical code will impact project engineering, improve safety and ensure that regulations keep up with the pace of technological advancements. There are several key takeaways that every installer should know to minimize safety hazards and avoid code violations.

States that have already adopted NEC 2020 include Colorado, Minnesota, Massachusetts and Maine. California, Connecticut, North Carolina, Rhode Island and a few others have started the process and should be adopting it in the coming months. (For the latest adoption status, please visit NFPA's website. That means changes could already be effective in your state, and if not, they'll be happening soon.

#### **Conductors, conduits and OCPDs**

The first revision to explore is within Article 690.8. It was rearranged for clarity and 690.8(A)(2) was added to introduce language that provides an alternative to the maximum circuit current calculation. Previously, the only method for calculating the maximum current of a string was through the multiplication of the maximum output of the PV module by 1.25 for irradiance correction. Now, we can base it off the rated input current of the conversion equipment, typically an inverter. This alternative method is more permissible and could result in smaller conductor sizes, sometimes by up to two standard sizes. In light of the upward trend for raw material prices, this could result in substantial savings in both copper conductors and conduit costs.

The next notable change is within Article 690.9(A). It now contains clearer language and leaves less room for interpretation regarding overcurrent protection of PV systems. Per 690.9(A)(3), installers now have the option of locating the Overcurrent Protection Device (OCPD) at either the supply end or the load end of the circuit in certain scenarios.

#### **Module-level rapid shutdown updates**

There were some modifications related to rapid shutdown within Article 690.12. The requirements for conductors outside the array boundary (1 ft from the array in all directions) hasn't changed, but the code now allows

the use of PV hazard control systems that are certified to the UL 3741 standard for conductors inside the array, such as the upcoming P1101 optimizer from SolarEdge. Installers will still have the option of using solutions that reduce the voltage within the array to 80 volts within 30 seconds or totally isolating the system with no exposed wiring methods.

The labeling requirements for rapid shutdown-equipped systems were modified within Article 690.56(C). The label verbiage for array-level rapid shutdown was removed since all rooftop PV systems complying with NEC 2020 will now require de-energization at the module-level. Regarding the location of the labels, it must be affixed to each piece of service equipment. However, it should be noted that the definition of service equipment is not limited to just service disconnects, so installers might need to affix it to other AC equipment depending on local AHJ interpretation.

#### **Disconnect safety**

There was language added to Article 690.13 requiring accessible disconnects to be equipped with a lock system or other solutions requiring a tool to open the enclosure. This is to mitigate risks associated with unintentional contact of live components by unqualified persons. Section E of the article lists all the types of disconnect switches that this requirement extends to, including remote-controlled switches that are operable locally.

#### **Wire management**

The next notable change is within Article 690.31. It now contains a table for correction factors going up to an ambient temperature of 120°C, up from 80°C previously. This applies to situations where conductors with higher temperature ratings are used, such as 125°C-rated XLPE cables. Revisions were made in section 690.31(B) that now allow for Class 1 circuits to be placed in the same raceways as DC circuits. The section was also modified to include the requirement of a marking scheme for the polarity of PV system conductors. When conductors are not color-coded, they have to be labeled "+," "POSITIVE," or "POS" for the positive conductor and "-", "NEGATIVE," or "NEG" for the negative conductor. Properly labeled and color-coded conductors can help reduce the time required to troubleshoot ground faults during commissioning and O&M of systems. It can also

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## Updates to NEC 2020 Cont'd

help prevent crossed polarity during installation, which could be hazardous to installers.

The maximum distance between supports for a single-conductor is now 24" instead of 12", which was the previous requirement. This will help increase labor efficiency when performing O&M on PV systems as the previous maximum support distance made it challenging to remove PV modules. 690.31 (C) now covers the use of multiconductor jacketed cables (commonly referred to as MC Cables) and proper installation methods for both rooftop and ground mount applications.

### Matching connectors

Intermateability of cable connectors used for the connection and splicing of PV conductors is now addressed within Article 690.33. Mismatched connectors have been shown to increase the likelihood of electrical arcs, which is one of the top causes of PV thermal events. It is not uncommon to see a pairing between Staubli MC4 (Multi-Contact 4mm) connectors that come pre-installed on many module-level power electronics, and "MC4 Compatible" connectors that come standard with certain PV module manufacturers. Mismatched connectors have also been observed at string wiring and DC homerun splices when installers do not procure connectors of the same make and model that come with the specific PV module. Connectors from different manufacturers might have differing tolerances during the manufacturing process, which could result in water ingress, hot spots and potentially thermal events in worst-case scenarios. This code revision now shines light on this issue and should help to minimize the occurrence of mismatched connectors by requiring a 100% match.

### Article 705

There are notable changes related to the interconnection of PV systems within Article 705, including clearer language around supply-side connections and disconnecting means. Section 705.13 was added to address the use of power control systems (PCS), which could enable larger system sizes where export is limited by the utility.

It is prudent for developers and EPCs to work with

engineering firms that are familiar with the latest electrical code and commercially available solutions to ensure their systems are engineered for safety and reliability. In addition, properly engineered systems take both constructability and O&M into consideration.

*SOURCE: Internet search NEC vs Solar – Updates to NEC 2020 NEC that Solar Installers need to know – by SPW/August 30, 2021 by Edgar Lim, Managing Director*

## 2023 NOMINATING COMMITTEE SLATE OF OFFICERS AND BOARD MEMBERS

Here is the Slate of Officers to be presented at our February 13, 2023 General Membership meeting.

<b>President</b>	<b>Steve Willinghurst (Retired Louisville JATC)</b>
<b>1st V Pres</b>	<b>Dave True (Retired NECA/Henderson Svc)</b>
<b>V Pres</b>	<b>Bruce Stansbury (Stansbury Ele Co)</b>
<b>Secretary</b>	<b>Marilyn Boudreaux (Retired LG&amp;E)</b>
<b>Treasury</b>	<b>Alan Akin (Treasurer)</b>
<b>Industrial Ele Contractor</b>	<b>Jerry Curry</b>
<b>Contractor</b>	<b>Woolsey Kit Caye (Caye Ele Co)</b>
<b>Ele Inspector</b>	<b>Kurt R. Wagner (Amteck)</b>
<b>Ele Inspector</b>	<b>Norbourne Thorpe (Louis Metro)</b>
<b>Distributor</b>	<b>Chris Johnson (Louis Metro)</b>
<b>Manufacturer</b>	<b>Tony Pittelko - Richards Electric</b>
	<b>Dennis Steier (Manf Rep/Consul)</b>
<b>LG&amp;E</b>	<b>Jamie Archer</b>
<b>LG&amp;E</b>	<b>Joel McCauley</b>

### Contractor Representatives:

<b>IAEI -</b>	<b>Dennis Steier – KY Chapter Sec</b>
<b>NECA -</b>	<b>Josh Quin (NECA)</b>
<b>IBEW -</b>	<b>Steve Willinghurst (IBEW)</b>
<b>IEC -</b>	<b>Mark Yates (IEC)</b>
<b>ABC -</b>	<b>Bruce Stansbury (ABC)</b>

**We are always looking for new/fresh Board Members. If you take an interest in all aspects of the Electrical Industry and play a role in its future, our Board offers you that opportunity, If you would like to be a part of the ECHL Board of Directors, please let one of the staff members know.**

**Thank you in advance for your interest.**

## 2023 CALENDAR OF EVENTS

### ELECTRICAL CLEARING HOUSE BOARD OF DIRECTOR'S

MONTH	Clearing House General Membership 1.5 CEU Hrs - Electrical License	Clearing House Executive Committee	Clearing House Contractors Class 6 CEU Hrs - Contrac- tors License	Kentucky State Advisory Board Meeting
JANUARY	9	18		
FEBRUARY	13	15	11	
MARCH	13	15		
APRIL	10	19		
MAY	8	17		
JUNE	-----	-----		
JULY	-----	-----		
AUGUST	-----	16		
SEPTEMBER	11	20		
OCTOBER	9	18		
NOVEMBER	13	15		
DECEMBER	11	13		

In the event of any changes, the committee involved will be notified.

### SPECIAL MEETINGS AND EVENTS

January	31	Feb 1, 2, 2023	Kentucky Chapter IAEI - Winter Meeting Jeffersonin, 10617 Taylorsville Rd, Jeffersontown, KY
February		11, 2023	ECHL Contractor Class - Elks Lodge #8 28/24 Klondike Ln, Louisville, KY 40218
February		13, 2023	ECHL Annual Election of Officers and Board Members Deadline for Scholarship Applications
April		21, 2023	Kentucky Chapter IAEI Board of Directors Meeting Jeffersonin, 10617 Taylorsville Rd, Jeffersontown, KY
August		8,9 & 10, 2023	Kentucky Chapter IAEI - Summer Meeting Clarion Hotel Lexington - Lexington, KY
September		15,16,17, 2023	IAEI Western Section - Annual Meeting Appleton, Wisconsin - Radisson Paper Valley Hotel
November		17, 2023	Kentucky Chapter IAEI Board of Directors Meeting Jeffersonin, 10617 Taylorsville Rd, Jeffersontown, KY